

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Project

Date

Author

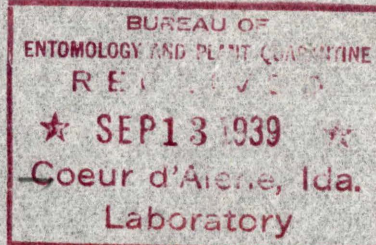
TITLE

REPORT OF WORK ON THE
HEMLOCK BORER INVESTIGATION
IN AUGUST 1939

by
H. C. Secrest

Milwaukee, Wisconsin
September 5, 1939

Bedard ✓



September 8, 1939

Dr. H. J. MacAloney
Milwaukee
Wisconsin

Dear MacAloney:

Secrest's report transmitted with your letter of September 5 describing the condition of the roots of drought injured trees and successful borer attack is most interesting.

It would appear that these borer attacked trees do not have much vitality left. We will be pleased to see the final report on this work when it has been prepared.

Sincerely yours,

F. C. Craighead
In Charge
Forest Insect Investigations

fcc-es
cc/Keen
Evenden
Miller
Brown
DeLeon

Milwaukee, Wisconsin
September 5, 1939

Report of Work on the Hemlock Borer Investigation in August 1939

by

H. C. Secrest

The hemlock root-condition study begun in July was continued during the first half of August. Hydraulic power, supplied by means of a Fairbanks-Morse 5-horsepower Typhoon pump, was used to wash away the soil and expose the root systems of 27 hemlock trees in various stages of vigor ranging from nearly dead to apparently healthy.

The following records were taken for each tree: The extent of hemlock borer infestation, if any, and the stages present, the number of points of fungus infection which could be detected externally on the root system, the color and density of the foliage, and the percentage of living roots. The last was limited to an examination of the cambium of the principal lateral roots. In addition, cross-sections of the trunk were taken at intervals of 17 feet for the purpose of studying ring growth and determining the number of years when wood was not laid on due to drought conditions.

The drought-injured trees appear to die from the terminal portions of the roots back toward the root crown. Successful borer attack was found only on trees which had 50 to 80 percent of their lateral roots dead to within at least 3 feet of the root crown.

Examination of these trees indicated an even greater reduction than 50 to 80 percent of the absorbing surfaces of the root systems, since many apparently healthy roots, where the cambium appeared alive and normal throughout frequently terminated in a mass of small rootlets which had as much as 50 percent, and even more, of their root tips killed, apparently by drought.

The study also showed that many of the trees were infected by Armillaria mellea prior to successful borer attack. All of the trees showing successful borer attack in 1938 for the first time showed advanced Armillaria attack of more than one year's standing. The white mycelial fans on some of these trees extended up the trunks several feet above the root crown. This indicates that hemlock borer attack is secondary to attack by Armillaria in many cases. Armillaria mellea is usually considered as a secondary fungus.

The latter part of the month was devoted to following the saw crews conducting a salvage operation in an area near Camp 29 which had an annual tree mortality of about 15 percent by volume last year. An examination of the annual rings showed that most of these trees had not laid on wood during the past 2 to 5 years. A difference of 2 rings was frequently found between the stump and the upper trunk sections, indication that for several years preceding death wood had not been laid on at the base of these trees.

In order to complete certain phases of the life history and biological studies, a certain amount of time was spent on these phases of the investigation. Bark samples taken from 16 of the trees examined in the salvage cutting, and constituting a total bark area of 6 to 10 feet per tree, showed that a little less than 700 beetles and little more than 700 parasites had emerged from each tree. This gives a parasitization of about 51 percent, which is a noticeable increase in the parasite population in the Reservation in 1939. The increase has been particularly noticeable in the Atanycolus species. Emergence of the borer continued throughout the month but the number during the latter part of the month was very low.

Copy